

Why Monitor Water Quality?

October 18, 2002 is the 30th anniversary of passage of the Clean Water Act, which was written to assess, protect, and improve water quality in the United States. To celebrate, this date has been declared National Water Monitoring Day, and demonstrations of water monitoring are planned in various locations in Wisconsin. This brings up the question of why monitoring is important. Even though Wisconsinites live in a state blessed with a bounty of lakes and rivers, we all live downstream of some other user, even if that user is a red squirrel or a whitetail deer.

Water quality monitoring is used to answer several questions:

- How good is the water in a river, lake, reservoir, etc. today?
- Is the water quality improving or becoming worse?
- What is making the water quality better or worse, and how can that improve?
- What are the effects of flooding (as in 1993) or drought (as in 2002) on the water we drink or the fish we catch?
- What does a water treatment plant need to do to make the incoming water drinkable?

Water quality in Wisconsin is generally good. Why should we be concerned?

- High nutrient levels in water can cause algae blooms and lower the amount of oxygen in water. This can hurt fish and make the water (even when treated) taste strange. This is a concern in many lakes, and particularly in areas of higher population density such as the southeastern part of the state.
- Concentrations of naturally occurring constituents such as arsenic and radon are variable in surface water and ground water of the state. In some locations the concentrations exceed those considered harmful to human health and aquatic life.
- Pesticides are frequently detected in both streams and ground water. Concentrations of pesticides are highest in rivers following rainfall events that occur in spring after application.
- Urban areas contribute trace elements and organics to streams, often at concentrations 10 times higher than non-urban areas.
- Mercury concentrations in fish tissues are high enough for consumption advisories to be posted for many rivers and lakes in the state.
- High amounts of sediment (sand, gravel, or silt from agricultural areas and areas of new construction) clog the gills of fish and the filters of drinking water treatment plants.

How long do we need to monitor water quality?

That depends on what question is being answered. For example, if you took water samples in 1993, during high runoff, or in 2002, during the drought conditions, you would measure very different water quality at the same location! Also, because Wisconsin's water flows vary depending on snowmelt in late winter, rainfall in late spring and summer, and the amount of ice cover during the winter months, the quality within a year changes dramatically between spring runoff and fall low-flow levels. This is called "seasonality." So, to measure whether water is getting better or worse, we need to sample during different seasons and over many years.

Who monitors water quality?

- Federal agencies, such as the EPA and the U.S. Geological Survey
- State agencies, including the Wisconsin Department of Natural Resources (for water trends, meeting water-quality standards, and checking on water dischargers like sewerage plants), the Wisconsin Geological and Natural History Survey (primarily ground water), the Wisconsin Department of Consumer Protection, etc.
- Your local drinking-water plant (to see what treatment is needed to make your water safe to drink)
- Any company that returns water to Wisconsin's rivers or streams
- Watershed groups or other citizens' groups that track local water quality
- Students and universities



Where can I find more information about water-quality monitoring?

There are many organizations and agencies that monitor water quality. A few websites are listed below.

<http://wi.water.usgs.gov/>

USGS Water Resources of Wisconsin: information about water in Wisconsin, including real-time streamflow and historical water-quality information

<http://www.dnr.state.wi.us/>

Wisconsin Department of Natural Resources: information about all sorts of environmental matters in Wisconsin

<http://wi.water.usgs.gov/lmmcc>

Lake Michigan Monitoring Coordination Council: begun in 1999 to foster cooperation and coordination among groups involved in all types of environmental monitoring activities

<http://www.great-lakes.net/>

Great Lakes Information Network: contains information and data related to the Great Lakes region

What is the Lake Michigan Monitoring Coordination Council (LMMCC)?

LMMCC was begun in 1999 to foster cooperation and coordination among groups involved in all types of environmental monitoring activities. The Council will work toward developing a systematic and comparable approach to the collection, data management, interpretation, and dissemination of environmental data related to issues, policies, and resource management involving environmental monitoring in the Lake Michigan Drainage Basin. The Council will address the full range of aquatic resources, including ground and surface waters, biology, chemistry, and physical components.

Answers to some common questions about water monitoring

Why regular water-quality measurements?

Taking a single water-quality measurement will not indicate how the property varies over time. For example, if you measure the pH of a stream and find that it is 5.5, you might think that the water is acidic because of a water-quality problem. But a pH of 5.5 might be “normal” for that stream. Similarly, one person’s normal body temperature may be about 97.5 degrees, but another person’s is right at 98.6. As with human temperatures, if the pH of a creek begins to change, then something might be affecting the water, and possibly, the water quality. So, often, the changes in water measurements are more important than the actual measured values.

Why long-term monitoring?

Long-term data collection, using consistent and comparable methodology, is critical to identify trends or patterns, to try to find out: “Are things getting better or worse?” Water quality is constantly changing—during the day, from day to day, from season to season, and from year to year. To distinguish real trends from short-term fluctuations, we need consistent and systematic information over the long term. This is also necessary for evaluating environmental strategies and choosing the most cost-effective strategies for the future.

What does biology have to do with water quality?

Biological communities are indicators of stream quality. Organisms such as algae, invertebrates (insects, worms, and clams),

and fish have a wide range of sensitivities to physical and chemical changes in their habitat. For example, increasing algae populations often correlate with higher concentrations of nutrients (nitrogen and phosphorus). Other indicators of degraded water quality are a preponderance of worms and midges, which are “tolerant” of pollution, or a fish community that is not diverse and abundant or that is composed of non-native species. Biological communities also reflect the overall health of a watershed. Physical processes, such as deforestation and fires, can alter stream habitat, hydrology, and stream temperature and can quickly degrade biological communities before nutrients and other contaminants reach levels that can degrade these communities.

What does water quantity have to do with water quality?

The quantity of streamflow (also called “discharge”) is an important factor in determining water quality and, thus, in interpreting water-quality data. The potential effects of contaminants on drinking-water supplies and aquatic habitats depend largely on the amount of water flowing in streams. You may have heard the outdated adage that “dilution is the solution to pollution.” More flow, however, usually means that rivers and streams are carrying a greater magnitude of contaminants and sediment, in part because of overland runoff. When waters carrying these increased loads reach gulfs and bays, aquatic plants and animals can be greatly affected, particularly if this occurs during the critical life cycles of these organisms.



For more information

Whom can I contact about water quality monitoring and LMMCC?

- Warren Gebert, U.S. Geological Survey, Wisconsin District Chief (608-828-9901)
- Charlie Peters, Lake Michigan Monitoring and Coordination Council (608-821-3810)